

REMARKS

The application has been reviewed in light of the Office Action mailed May 6, 2004. Claims 17-36 were pending at the time of the office action. Claims 17-36 were rejected. Applicant has amended Claims 17, 19, 22, 23, 30 and 33. Applicant has canceled Claim 28 without prejudice or disclaimer. Applicant respectfully requests reconsideration and favorable action in this case.

Rejections under 35 U.S.C. §112

Claim 33 stands rejected by the Examiner under 35 U.S.C. §112, first paragraph, for containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Applicant has amended Claim 33 to overcome this rejection.

Claims 17-36 stand rejected by the Examiner under 35 U.S.C. §112, second paragraph, as being indefinite and failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has amended Claims 17, 19, 22, 23, 30 and 33 to overcome these rejections.

Rejections under 35 U.S.C. §103

Claims 17, 18, 20, 25-32 and 34-36 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,254,750 issued to Patrick et al. ("Patrick et al.") in view of U.S. Patent 5,869,744 issued to Norio Suzuki et al. ("Suzuki et al.") and U.S. Patent 4,668,873 issued to Masahiro Ohba et al. ("Ohba et al."). Applicant has canceled Claim 28 without prejudice or disclaimer. Applicant respectfully traverses and submits that Claims 17, 18, 20, 25-27 and 29-32 and 34-36 are patentable over Patrick et al. in view of Suzuki et al. and Ohba et al.

In order to establish a prima facie case of obviousness, the references cited by the Examiner must disclose all claimed limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Furthermore, according to § 2143 of the Manual of Patent Examining Procedure, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in

the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Patrick et al. discloses "a modified universal exhaust gas oxygen sensor ... [that] can be used to measure the concentration of a variety of components of a gaseous fuel emission including CO, CO₂, O₂, H₂, and H₂O." (Abstract)

Suzuki et al. discloses "an oxygen concentration-detecting device [that] detects the concentration of oxygen present in exhaust gases emitted from an internal combustion engine." (Abstract)

Ohba et al. discloses a "case for accommodating an electronic circuit for an electronic control system mounted on a vehicle [that] is formed of an electric conductor and is electrically isolated from the grounding terminal of the electronic circuit which is provided on a printed substrate." (Abstract)

Applicant's amended Claim 17 calls for various features including a "nitrogen oxide sensor and a first connecting line for transmission of data from the sensor to an evaluating unit forming a part of an interface for digitization of the data, and with a second connecting line for transmission of the digitized data from the evaluating unit to an engine control device, characterized in that: the interface is a plug connector having a housing, wherein the evaluating unit is integrated into the housing."

Applicant's amended Claim 30 calls for various features including, among others, an "evaluating unit forming a part of the interface, the evaluating unit operable to convert the data from the probe into a digital signal having a reduced number of conductors on the interface, wherein the interface comprises a plug connector having a housing such that the evaluating unit is integrated within the housing."

Patrick et al., Suzuki et al. or Ohba et al. do not make obvious Applicant's Claim 17 or Claim 30 because Patrick et al., Suzuki et al. or Ohba et al. does not teach, suggest or disclose all of the elements recited by amended Claims 17 or 30. For example, Patrick et al., Suzuki et al. and Ohba et al. fail to teach, disclose or suggest a "nitrogen oxide sensor and a

first connecting line for transmission of data from the sensor to an evaluating unit forming a part of an interface for digitization of the data, and with a second connecting line for transmission of the digitized data from the evaluating unit to an engine control device, characterized in that: the interface is a plug connector having a housing, wherein the *evaluating unit is integrated into the housing*,” as recited by amended Claim 17. (emphasis added) Additionally, Patrick et al., Suzuki et al. and Ohba et al. fail to teach, disclose or suggest an “evaluating unit forming a part of the interface, the evaluating unit operable to convert the data from the probe into a digital signal having a reduced number of conductors on the interface, wherein the interface comprises a plug connector having a housing such that the *evaluating unit is integrated within the housing*,” as recited by amended Claim 30. (emphasis added)

In fact, the Examiner admits that Patrick et al. “does not expressly disclose digitization of data, a housing for the connector, a microprocessor ..., heating regulation ..., data adjustment by the engine control ..., [and] location of the interface.” (Part of Paper No. 30, page 4) However, the Examiner states that the memory device of Patrick et al. suggest the evaluating unit of Applicant’s invention. Applicant respectfully disagrees and submits that the memory device of Patrick et al. is used for calibration of the sensor, storing information about the sensor, monitoring and controlling the operation of the sensor, and detecting when the sensor has been used beyond its limits. (See Patrick et al. Col. 11, line 42 to Col. 12, line 12) In contrast, Applicant’s invention integrates a sensor with an evaluating unit into an interface. (See Applicant’s Specification page 2, lines 16-18) Thus, Applicant asserts that combining the memory device of Patrick et al. with either Suzuki et al. or Ohba et al. does not teach, suggest or disclose the evaluating unit of Applicant’s invention.

There is no motivation or suggestion to combine the sensor of Patrick et al. with the electronic circuit case of Ohba et al. The case of Ohba et al. is made to contain “electronic circuits 2 for an electronically-controlled fuel injection system, an ignition timing control system, a display control systems and the like electronic control systems.” (Col. 2, lines 1-5) Because Patrick et al. discloses a sensor for exhaust gas and not a fuel injection system or timing control system, there is no motivation or suggestion to combine Patrick et al. with Ohba et al.

Additionally, Applicant asserts that there is no motivation to combine the sensor of Patrick et al with the control device of Suzuki et al. and the case of Ohba et al. For example, Ohba et al. uses an electrically isolated case formed of an electrical conductor for an electronic circuit to prevent “faulty actuation of the electronic control system which might be caused by the electromagnetic wave.” (Abstract) But, there is no motivation to combine this feature with the analog to digital converter of Suzuki et al. because digital signals are less sensitive to electromagnetic interference.

Therefore, Applicant respectfully submits that neither Patrick et al., Suzuki et al. or Ohba et al. alone or in combination make obvious amended Claims 17 or 30 and, as such, Claims 17 and 30 are patentable over Patrick et al. in view of Suzuki et al. and Ohba et al.

Claims 18, 20, 25-27 and 29 directly or indirectly depend from and provide further patentable limitations to amended independent Claim 17. Claims 31, 32 and 34-36 directly or indirectly depend from and provide further patentable limitations to amended Claim 30. Because amended Claims 17 and 30 are deemed allowable, Claims 17, 18, 20, 25-27, 29-32 and 34-36 are allowable. Therefore, Applicant respectfully requests the Examiner to withdraw the rejection and allow Claims 17, 18, 20, 25-27, 29-32 and 34-36.

Claims 17, 20, 21, 23-32 and 34-36 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Patrick et al. in view of Suzuki et al. and U.S. Patent 4,963,246 issued to Yoyohei Nakajima et al. (“Nakajima et al.”). Applicant has canceled Claim 28 without prejudice or disclaimer. Applicant respectfully traverses and submits that Claims 17, 20, 21, 23-32 and 34-36 are patentable over Patrick et al. in view of Suzuki et al. and Nakajima et al.

Patrick et al. discloses “a modified universal exhaust gas oxygen sensor ... [that] can be used to measure the concentration of a variety of components of a gaseous fuel emission including CO, CO₂, O₂, H₂, and H₂O.” (Abstract)

Suzuki et al. discloses “an oxygen concentration-detecting device [that] detects the concentration of oxygen present in exhaust gases emitted from an internal combustion engine.” (Abstract)

Nakajima et al. discloses “an oxygen concentration-sensing device [that] has an oxygen concentration-sensing element which senses the concentration of oxygen contained in a gas, and a heater which heats the sensing element.” (Abstract)

Applicant's amended Claim 17 calls for various features including a "nitrogen oxide sensor and a first connecting line for transmission of data from the sensor to an evaluating unit forming a part of an interface for digitization of the data, and with a second connecting line for transmission of the digitized data from the evaluating unit to an engine control device, characterized in that: the interface is a plug connector having a housing, wherein the evaluating unit is integrated into the housing."

Applicant's amended Claim 30 calls for various features including, among others, an "evaluating unit forming a part of the interface, the evaluating unit operable to convert the data from the probe into a digital signal having a reduced number of conductors on the interface, wherein the interface comprises a plug connector having a housing such that the evaluating unit is integrated within the housing."

Patrick et al., Suzuki et al. or Nakajima et al. do not make obvious Applicant's Claim 17 or Claim 30 because Patrick et al., Suzuki et al. or Nakajima et al. does not teach, suggest or disclose all of the elements recited by amended Claims 17 or 30. For example, Patrick et al., Suzuki et al. and Nakajima et al. fail to teach, disclose or suggest a "nitrogen oxide sensor and a first connecting line for transmission of data from the sensor to an evaluating unit forming a part of an interface for digitization of the data, and with a second connecting line for transmission of the digitized data from the evaluating unit to an engine control device, characterized in that: the interface is a plug connector having a housing, wherein the *evaluating unit is integrated into the housing*," as recited by amended Claim 17. (emphasis added) Additionally, Patrick et al., Suzuki et al. and Nakajima et al. fail to teach, disclose or suggest an "evaluating unit forming a part of the interface, the evaluating unit operable to convert the data from the probe into a digital signal having a reduced number of conductors on the interface, wherein the interface comprises a plug connector having a housing such that the *evaluating unit is integrated within the housing*," as recited by amended Claim 30. (emphasis added)

In fact, the Examiner admits that Patrick et al. "does not expressly disclose digitization of data, a housing for the connector, a microprocessor ..., heating regulation ..., data adjustment by the engine control ..., [and] location of the interface." (Part of Paper No. 30, page 4) However, the Examiner states that the memory device of Patrick et al. suggest the evaluating unit of Applicant's invention. Applicant respectfully disagrees and submits

that the memory device of Patrick et al. is used for calibration of the sensor, storing information about the sensor, monitoring and controlling the operation of the sensor, and detecting when the sensor has been used beyond its limits. (See Patrick et al. Col. 11, line 42 to Col. 12, line 12) In contrast, Applicant's invention integrates a sensor with an evaluating unit into an interface. (See Applicant's Specification page 2, lines 16-18) Thus, Applicant asserts that combining the memory device of Patrick et al. with either Suzuki et al. or Nakajima et al. does not teach, suggest or disclose the evaluating unit of Applicant's invention.

The Examiner has stated that "Suzuki et al. discloses the claimed invention except for the plug connector." (See Paper No. 21 page 2) And the Examiner has stated that "Patrick et al. does not expressly disclose," among other elements, "a housing for the connector." However, the Examiner has stated that "Nakajima et al teaches that it is known to provide a sensor interface circuit integral with a plug connector" and that "the interface connected to a system bus 407 (FIG. 2)," (Part of Paper No. 30, page 6) With regard to this statement, Applicant respectfully disagrees with the Examiner. Applicant asserts that the coupler of Nakajima et al. has compensating resistors and is not directly connected to a system bus. The coupler is indirectly connected to a system bus located in the ECU such that the signal is converted to a digital signal in the ECU prior to being placed on the system bus. (See Nakajima et al. FIG. 2)

Applicant asserts that there is no motivation to combine a coupler with a compensating resistance with a control device of Suzuki. In fact, Nakajima et al. teaches that the control circuit in the ECU "comprises a microcomputer" that is "connected to various engine parameter sensors, (not shown) such as an engine rotational speed (N_e) sensor, an intake absolute pressure (P_{BA}) sensor, and an engine coolant temperature (T_W) sensor." (See Nakajima et al. Col. 17, line 52-62) As such, there is no teaching, suggestion or motivation to relocate the control circuit into the coupler. As such, Applicant asserts that relocating the microcomputer from the ECU to the coupler to make obvious Applicant's invention is improper hindsight.

Therefore, Applicant respectfully submits that neither Patrick et al., Suzuki et al. or Nakajima et al. alone or in combination make obvious amended Claims 17 or 30 and, as such,

Claims 17 and 30 are patentable over Patrick et al. in view of Suzuki et al. and Nakajima et al.

Claims 20, 21, 23-27 and 29 directly or indirectly depend from and provide further patentable limitations to amended independent Claim 17. Claims 31, 32 and 34-36 directly or indirectly depend from and provide further patentable limitations to amended independent Claim 30. Because amended Claims 17 and 30 are deemed allowable, Claims 20, 21, 23-27, 29, 31, 32 and 34-36 are allowable. Therefore, Applicant respectfully requests the Examiner to withdraw the rejection and allow Claims 17, 20, 21, 23-27, 29-32 and 34-36, as amended.

Claim 22 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Patrick et al. in view of Suzuki et al. and U.S. Patent 4,668,873 issued to Masahiro Ohba et al. ("Ohba et al.") as applied to Claims 17, 18, 20, 25-32 and 34-36 above, and further in view of U.S. Patent 5,024,534 issued to Yoshihiro Matsubara et al. ("Matsubara et al."). Applicant respectfully traverses and submits that Claim 22 is patentable over Patrick et al. in view of Suzuki et al. and Ohba et al. as applied to Claims 17, 18, 20, 25-32 and 34-36 above, and further in view of Matsubara et al.

Claim 22 directly or indirectly depend from and provide further patentable limitations to independent Claim 17, as amended. Because Claim 17 is deemed allowable, Claim 22 is allowable. Therefore, Applicant respectfully requests the Examiner to withdraw the rejection and allow Claim 22.

Allowable Subject Matter

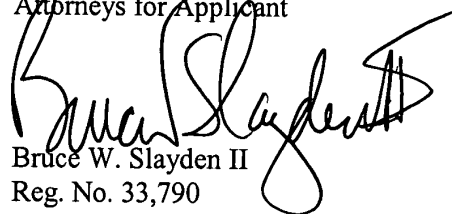
Applicant appreciates Examiner's consideration and indication that Claims 19 and 33 would be allowable if rewritten to overcome the rejections under 35 U.S.C. §112, first and/or second paragraph, as set forth in the Office Action and to include all of the limitations of the base claim and any intervening claims. Applicant has amended Claims 17, 19, 22, 23, 30 and 33 and provided remarks to the Examiner to overcome these rejections and respectfully requests withdrawal of all rejections and allowance of Claims 17-27 and 29-36, as amended.

CONCLUSION

Applicant has made an earnest attempt to place this case in condition for allowance. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests reconsideration and full allowance of the claims as amended.

Applicant believes no further fee is due for this response, however, if any additional fees are due, the Commissioner is hereby authorized to charge any necessary fees to Deposit Account No. 50-2148 of Baker Botts L.L.P.

Respectfully submitted,
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